ABSTRACT

The present invention discloses an efficient architecture for routing in a very large autonomous system where many of the layer 3 routers are attached to a common connection-oriented layer 2 subnetwork, such as an ATM network. In a preferred embodiment of the invention, a permanent topology of routers coupled to the subnetwork is connected by permanent virtual circuits. The routers can further take advantage of both intra-area and inter-area shortcuts through the layer 2 network to improve network performance. The routers pre-calculate shortcuts using information from link state packets broadcast by other routers and store the shortcuts to a given destination in a forwarding table, along with corresponding entries for a next hop along the permanent topology. The present invention allows the network to continue to operate correctly if layer 2 resource limitations preclude the setup of additional shortcuts.